REMARKS/ARGUMENTS

In paragraph 3 on page 3 of the Official Action, the disclosure was objected to because it contained an embedded hyperlink on page 11, line 3. The specification has been amended to remove the hyperlink from the specification.

In paragraph 5 on page 3 of the Official Action, claims 2-14 and 16-26 were rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong et al. (WO 2000/60861) in view of Mizutani (U.S. Patent 6,115,740). In reply, claim 10 has been cancelled, claim 11 has been amended to depend on claim 12, claim 12 has been re-written in independent form including all of the limitations of its base claim and any intervening claims, claim 24 has been cancelled, claim 25 has been amended to depend from claim 26, and claim 26 has been re-written in independent form including all of the limitations of its base claim and any intervening claims. Applicants respectfully traverse the rejection of claims 2-9, 11-14, 16-23, and 25-26 on the grounds that the claimed invention would not have been obvious from Armstrong and Mizutani.

The invention is directed to a video file server and a method of operating a video file server. The applicants' independent claims 2 and 16 are directed to ranking movies with respect to popularity, and pre-assigning a respective set of data movers for servicing video streams for each movie ranking, wherein the data movers in the respective sets of data movers are configured differently for providing more network interface resources for very popular movies and for providing more local cache memory resources for less popular movies.

The policy of the Patent and Trademark Office has been to follow in each and every case the standard of patentability enunciated by the Supreme Court in Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). M.P.E.P. § 2141. As stated by the Supreme Court:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

148 U.S.P.Q. at 467.

The problem that the inventor is trying to solve must be considered in determining whether or not the invention would have been obvious. The invention as a whole embraces the structure, properties and problems it solves. In re Wright, 848 F.2d 1216, 1219, 6 U.S.P.Q.2d 1959, 1961 (Fed. Cir. 1988).

Armstrong discloses a method and apparatus for hierarchical distribution of video content for an interactive information distribution system. (Title.) A first embodiment shown in FIG. 1 comprises a remote server head-end 110R and a plurality of head-ends 110_i through 110_n each being coupled to at least one of a corresponding plurality of neighborhoods 130_i through 130_n. (Page 6, lines 13-19.) Each head-end comprises a host workstation 112, a video stream server 114, and a primary storage partition 118 comprised of an array of hard drives. (Page 6, lines 20-24.) Video streams are transmitted from the video stream server 114 to the subscriber's respective subscriber

equipment comprised of a set-top box 142, a display 144 and a control device 145. (Page 6 line 32 to page 7 line 2.) The remote server head-end 110R also includes a secondary storage partition 119R coupled to the remote server 114R. (Page 7, lines 11-13.) A primary storage partition 118 of a head-end 110, including the remote server head-end 110R, is used to store frequently requested video assets. Alternately, the secondary storage partition 119 of the remote server head-end 110R is used to store infrequently requested video assets. (Page 7, lines 17-20.) The content manager 120 tracks the number of requests for a video asset and produces an asset request rate. An operator using the host workstation 112 defines a threshold rate for each video asset. The content manager 120 periodically compares the asset request rate against the threshold rate for each video asset in the system 100. If the asset request rate traverses the threshold rate for the video asset, then the video asset is stored on the primary storage partitions 118 and 118R at each of the head-ends 110 and 110R. If the asset request rate does not traverse the threshold rate for a video asset, then the video asset is stored on the secondary storage partition 119R at the remote server head-end 110R. In this manner video assets are dynamically distributed throughout the interactive information distribution system 110. (Page 7, lines 21-31.)

Armstrong discloses a second embodiment in FIG. 2. In FIG. 2, the primary storage device 216 of the head-ends 210 is apportioned into at least two storage partitions designated as a primary storage partition 218, and a secondary storage partition 219. (Page 9, lines 14-16.) The primary storage partition 218 on the primary storage device 216 at each head-end 210 is used to store frequently requested video assets and temporarily cached library video assets. Each primary storage partition 218 at each head-end typically has the same frequently requested video assets as any other

head-end 210. The secondary storage partition 219 is used to store portions of the infrequently requested video assets. An entire library of infrequently requested video assets is divided and stored amongst the plurality of head-ends 210 at each of the secondary storage partitions 219 on their respective primary storage devices 216. An infrequently requested video asset is typically stored on the secondary storage partition 219 at a single head-end 210. However, the request rate for that video asset may warrant additional storage at other head-ends. As such the content may be replicated and stored thereafter. In this manner, video assets that do not warrant storage across the entire system of head-ends 210 in the interactive information distribution system 200, may still be dynamically stored at multiple head-ends 210. Such dynamic storage corresponding to those neighborhoods having hither request rates than others is made in accordance with an algorithm that allows maximum access to the video titles with minimum network const associated with their delivery. (Page 10, lines 1-19.) A threshold rate is a value for each requested video asset, established by the service provider in the interactive information distribution system 100, which defines a level to be considered as frequent or infrequent request by the subscribers. Each video asset may have multiple threshold rates. Multiple threshold rates are set to establish various parameters for the storage locations of video information. Such parameters include discarding the video asset, storing it as a single head-end 110, replicating the video asset and storing it at more than one head-end 110 where the request rate warrants it, or storing it as all the head-ends 110 across the entire interactive information distribution system 100. (Page 14, lines 1 to 28.)

Page 4 of the Official action says: "Armstrong teaches, 'wherein the movies are ranked with respect to popularity ...' by disclosing primary storage partition 218 is used to store frequently requested video assets and secondary storage partition 219 is used to store infrequently requested video assets (page 10, lines 1-10)." Applicants respectfully disagree. Ranking is different from simply classifying movies as either frequently requested or not frequently requested. The plain meaning of the verb "rank" is "To arrange in a series in ascending or descending order of importance." (See, for example, the definition on the enclosed copy of page 825 of Rudolf F. Graf, Modern Dictionary of Electronics, Butterworth-Heinemann, Newton, Ma 1997.) Such ranking of movies is shown in applicants' FIG. 5.

Page 4 of the Official Action says: "Armstrong teaches, 'wherein the data movers in the respective sets of data movers are configured differently for providing more network interface resources for very popular movies and for providing more local cache memory resources for less popular movies' by disclosing headend 210_2-210_n comprise primary storage partition 218 is used to store frequently requested video assets and secondary storage partition 219 is used to store infrequently requested video assets." Applicants respectfully disagree. It appears that each head-end data mover in Armstrong has the same configuration with respect to cache resources and network interface resources. For example, compare Armstrong FIGS. 1 and 2 to the applicants' FIG. 4 (showing data movers having different configurations of cache RAM cards and network interface cards). In addition, the portions of Armstrong reproduced above suggest that <u>more</u> of the local cache memory will be used for storing <u>more popular</u> movies than less popular movies.

Where the prior art references fail to teach a claim limitation, there must be "concrete evidence" in the record to support an obviousness rejection. "Basic knowledge" or "common sense" is insufficient. In re Zurko, 258 F.3d 1379, 1385-86, 59 U.S.P.Q.2d 1693, 1697 (Fed. Cir. 2001).

Page 4 of the Official action says: "Armstrong fails to disclose a respective set of data movers pre-assigned for servicing video streams for each movie ranking." The Official Action cites Mizutani for this feature.

Mizutani (US 6,115,740) discloses a video file server system for dynamically allocating contents and delivering data. (See title.) The video server system has a plurality of video servers having respective contents storing units for storing contents and respective contents delivering units for delivering contents. A management server has a stream supply information managing unit for managing stream supply information relative to the delivery of the contents and a contents dynamic allocating unit for controlling the storage of the contents between the video servers to dynamically allocate contents based on stream supply information from the stream supply information managing unit. (Abstract.) Mizutani says that different kinds of content C0, C1, C2, ... (e.g., different digitally moving image data, col. 1, lines 15-16) can be stored in a video server system. Each video server in the system can deliver a maximum number (Nstrm) of streams. (Col. 1, lines 48-49.) The maximum number of streams of content that can be delivered at one time from an entire video server system may be increased by increasing the

number of installed video servers. (Col. 1, lines 30-33.) In order to avoid rejection of a request for the delivery of a content stream C1, it is necessary that the content C1 be stored in the video server beforehand in expectation of access to the content C1. (Col. 1, lines 1-4.) The estimated number of video servers which can be installed (Nvsa) is the sum for all *i* of Pi/Nstrm, where Pi represents the maximum number of times that each of the contents is simultaneously accessed per day, and *i* represents the type of a content. (Col. 2, lines 9-20.)

Mizutani says it has been customary to predict concentrated access to certain contents, estimate the number of video servers to be installed, and statistically allocate appropriate contents in the video servers before the video system is put into service. (Col. 3, lines 1-5.) Mizutani says that this conventional static contents allocation scheme usually results in an excessive estimate of the required number of servers to be installed (col. 3, lines 36-37) because of an incorrect assumption that the maximum numbers Pi of times that the respective contents Ci are simultaneously accessed occur at a common time (col. 3, lines 6-11). Instead, in normal circumstances, different users access different kinds of contents at different times. For example, news programs are popular in the morning, and movies are popular in the evening, and some users prefer to see video programs early in the evening and others late in the evening. (Column 3, lines 30-35.)

Mizutani's solution to the problems of the conventional static contents allocation scheme (col. 3, lines 26-28) is to dynamically allocate the contents (col. 3, lines 48-56). The contents are dynamically allocated by detecting whether at least the number of streams of a content stored in

a video server or the predictable number of accesses exceeds a corresponding threshold value or not, and if the number exceeds the threshold value, controlling the storage of the content between the video server or another video server, for thereby dynamically allocating the content. (Column 4, lines 3-11.) Predicted values used by the video file server system for dynamically allocating contents include a predicted maximum number A(s,t) of times that a video server *s* is simultaneously accessed at a time *t*. (Col. 6, lines 6-24.) If there is a request from a user at time t, then the video server whose A(s,t) is the smallest serves as a delivering video server for delivering a requested content. (Col. 6, lines 25-27.) Another predicted value is a number B(i,t) of lacking resources of the content i predicted at the time t. (Col. 6, lines 28-29.) The predicted maximum number B(i,t) is periodically checked for all contents, and the contents are dynamically allocated by being copied, moved, and deleted so that B(i,t)=0 as much as possible. (Col. 6, lines 51-54.) Contents are allocated according to a video server having smallest predicted number of simultaneous accesses at a given time. (Col. 14, lines 8-18.)

Page 4 of the Official Action says: "Mizutani further teaches using the predicted number of times that the content I is simultaneously accessed at the time t is represented by Pi(t) and the equation for B(i,t) is used to determine if content is lacking resources to determine how may streams on each server are necessary to facilitate requests (Col. 6, lines 32-38)." As introduced above, however, B(i,t) is a number of lacking resources of the content i predicted at the time t (Col. 6, lines 28-29), and ranking is different from a number of lacking resources.

Page 4 of the Official Action further says: "Figure 7 further discloses pre-assigning content, C0 and C1, to servers SV0 and SV1 or 'data movers'. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Armstrong with the teachings of Mizutani in order to preassign data movers to service video streams for the benefit of making more resources available for more popular content." However, the applicants' invention of claim 2 does not result merely by assigning copies of popular content to be stored in the local cache of particular server head-ends in FIG. 1 or FIG. 2 of Armstrong. Nor does the prior art as a whole suggest that Armstrong and Mizutani should be combined or modified as required to arrive at the applicant's invention.

As introduced above, Armstrong uses a threshold technique for hierarchical distribution of video content in a video-on-demand system. Armstrong's technique appears entirely suitable for its intended purpose.

Mizutani finds fault with the prior art static contents allocation scheme (col. 3, lines 26-28) and teaches instead a method of dynamically allocating contents. It is respectfully submitted that from the viewpoint of FIG. 16 as a point of origin, Mizutani and the applicants of the present invention go off in different directions in an attempt to provide more efficient allocation of video server resources and thus avoid installation of an excessive number of video servers to satisfy client demand. Mizutani does not appear to care which contents are popular and which are not, because the invention of Mizutani should dynamically move content between the servers to suit changing conditions. A reference such as Mizutani should be considered as a

whole, and portions arguing against or teaching away from the claimed invention must be considered. Basch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 230 U.S.P.Q. 416 (Fed. Cir. 1986), cert. denied, 484 U.S. 823 (1987).

In short, neither Armstrong nor Mizutani appear to suggest that the content should be ranked and the video servers in a video-on-demand system should be configured differently for providing more network interface resources for more popular movies and for providing more local cache memory resources for less popular movies.

With respect to claim 4, for the same reasons, since Armstrong appears entirely suitable for its intended purpose, it is not seen why one of ordinary skill would have been motivated to modify Armstrong in view of FIG. 16 of Mizutani.

With respect to claim 5, the Official Action says: "Armstrong fails to explicitly disclose transferring the movie data to a data mover servicing a next higher/lower movie ranking." It is also not clear whether the links in Armstrong between the head end servers are direct or not. Applicants also disagree with the contention that it is notoriously well known in the art to transfer movie data to servers serving a next higher/lower movie ranking, since the examination should be based on actual evidence, and in the context of applicants' specification, ranking is something more than simply classifying movies as either frequently requested or not frequently requested.

With respect to claim 12, see the discussion above with respect to applicants' claim 2.

With respect to claim 13, see the discussion above with respect to applicants' claim 5.

With respect to claim 16, see the discussion above with respect to applicants' claim 2.

With respect to claim 18, see the discussion above with respect to applicants' claim 4.

With respect to claim 19, see the discussion above with respect to applicants' claim 5.

With respect to claim 26, see the discussion above with respect to applicants' claim 2.

New claims 27 to 30 specifically define that the respective sets of data movers are configured differently by having fewer cache memory resources and more network interface resources in the data movers that service more popular movies than in the data movers that service less popular movies. Support for these new claims is found in applicants' FIG. 4 and page 13 lines 15-23 of their original specification.

In view of the above, reconsideration is respectfully requested, and early allowance is earnestly solicited.

Respectfully submitted,

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random-number generator—A special machine routine or hardware that produces a random number or series of random numbers in accordance with specified limitations.

random pard—Pertains to that portion of the total pard in an electric power supply which is not periodic. This phenomenon is frequently referred to as noise.

random processing—The treatment of information without respect to where it is located in external storage and in an arbitrary sequence determined by the input against which it is to be processed.

random pulsing—Varying the repetition rate of pulses by noise modulation or continuous frequency change.

random sample — A sample in which every item in the lot is equally likely to be selected in the sample.

random sampling—1. A sampling process in which there is a significant time uncertainty between the signal being sampled and the taking of samples. 2. A selection of observations taken from all of the observations of a phenomenon in such a way that each chosen observation has the same possibility of selection.

random-sampling oscilloscope — An oscilloscope that functions by constructing a coherent display from samples taken at random.

random sequential memory—A memory in which one reference can be found immediately; the other reference is found in a fixed sequence.

random signals—Waveforms having at least one parameter (usually amplitude) that is a random function of time (e.g., thermal noise or shot noise).

random variable—1. Also called variate. The result of a random experiment. 2. A discrete or continuous variable which may assume any one of a number of values, each having the same probability of occurrence. 3. Also called stochastic variable. Any signal the amplitude or phase of which cannot be predicted by a study of previous values of the signal.

random variation—A fluctuation in data which is due to uncertain or random occurrences.

random velocity — The instantaneous velocity of a particle without regard to direction. It may be characterized by its distribution function or by its average, root-mean-square, or most probable value.

random vibration—A vibration generally composed of a broad, continuous spectrum of frequencies, the instantaneous magnitude of which cannot be specified to any given moment of time. Instantaneous amplitude can only be defined statistically by a probability distribution function that gives the fraction of the total time that the amplitude lies within specified amplitude intervals. (If random vibration has instantaneous magnitudes distributed according to the Gaussian distribution, it is called Gaussian random vibration.) *See also* White Noise.

random winding — A coil winding in which the turns and layers are not regularly positioned or spaced but are positioned haphazardly.

random wound — Describing a coil wound without care to ensure that the wire is in layers. Random-wound coils have fewer turns for a given volume.

range—1. The maximum useful distance of a radar or radio transmitter. 2. The difference between the maximum and the minimum value of a variable. 3. The set of values that may be assumed by a quantity or function. 4. *See* Receiving Margin.

range-amplitude display—A radar display in which a time base provides the range scale from which echoes appear as deflections normal to the base.

range calibration — Adjustment of radar-range indications by use of known range targets or delayed signals so that, when on target, the radar set will indicate the correct range.

range coding — A method of coding a beacon response so that the response appears as a series of pulses on a radarscope. The coding provides identification.

range finder—1. A movable, calibrated unit of the receiving mechanism of a teletypewriter that can be used to move the selecting interval relative to the start signal. 2. An optical distance finder that depends on triangulation of two convergent beams on an object from disparate viewpoints. A pair of unaided human eyes coupled with a computerlike brain can estimate distance, at least for nearby objects, with some accuracy. 3. A device that depends on the measurement of time of wave travel from an object to a point, as in radar and sonar.

range gate—A gate voltage used to select radar echoes from a very short-range interval.

range-height indicator — A radar display on which an echo appears as a bright spot on a rectangular field. The slant range is indicated along the x-axis, and the height above the horizontal plane (on a magnified scale) along the y-axis. A cursor shows the height above the earth. Abbreviated rhi.

range mark—*See* Distance Mark.

range marker—A variable or movable discontinuity in the range time base of a radar display (in the case of a ppi, a ring). It is used for measuring the range of an echo or calibrating the range scale.

range of an instrument — *See* Total Range of an Instrument.

range of gain—The minimum and maximum gain to which the amplifier can be set.

range resolution—The minimum difference in range between two radar targets along the same line of bearing for which an operator can distinguish between targets.

range ring — An accurate, adjustable ranging mark on a plan-position indicator corresponding to a range step on a type-M indicator.

range step—The vertical displacement on an M-indicator sweep to measure range.

range surveillance — Surveillance of a missile range by means of electronic and other equipment.

range unit—A radar-system component used for control and indication (usually counters) of range measurements.

range zero—Alignment of the start of a sweep trace with zero range.

ranging oscillator—An oscillator circuit containing an *LC* resonant combination in the cathode circuit, usually used in radar equipment to provide range marks.

rank—To arrange in a series in ascending or descending order of importance.

rapid memory—*See* Rapid Storage.

rapid storage — Computer storage in which the access time is very short; rapid access usually is gained by limiting the storage capacity. Also called rapid memory, fast-access storage, and high-speed storage.

rare gas—*See* Noble Gas.

raser—Acronym for Radio Amplification by Stimulated Emission of Radiation, a chemical "pumping" process that is accomplished without external radiation.

raster—1. On the screen of a cathode-ray tube, a predetermined pattern of scanning lines which provide substantially uniform coverage of an area. 2. The illuminated area produced by the scanning lines on a television picture tube when no signal is being received. 3. Rectangular line pattern of light produced on the screen of a cathode-ray tube with no signal present. It is formed by deflecting the electron beam rapidly from left to right and relatively slowly from top to bottom. 5. The pattern of lines traced by rectilinear scanning in display systems.

raster burn—In camera tubes, a change in the characteristics of the area that has been scanned. As a result, a spurious signal corresponding to that area will be produced when a larger or tilted raster is scanned.

raster display—1. A display in which the entire display surface is scanned at a constant refresh rate. 2. A refresh graphics system where the electron beam sweeps horizontally across the face of the crt from left to right, drawing the picture as a series of scan lines. At the end of each line, the beam is turned off and reposi-